Hoogheemraadschap Stichtse Rijnlanden

One of the responsibilities of the *Hoogheemraadschap* is protecting the land from water in its broadest sense. Not only is it responsible for guarding the water quality at water treatment plants, but also for monitoring discharge standards. So far, there are no discharge standards regarding drug residues.

The scope of the problem

Because of the ageing population , the use of drugs has been increasing steadily over the past years and is expected to continue to grow in the future. The increase in drug use inevitably leads to a rise in concentration of drug residues in surface water. Surface water seeps to the groundwater, which is used for drinking water. This means that the drug residues present in surface water will ultimately end up in drinking water. Therefore it is important to measure the water quality in water treatment plants. This way, the efficiency of drug residue removal from excretion products can be measured.

Although there are no set rules on the maximal tolerated concentration of drug residues, it is very likely that they do pose threats to public and environmental health. However, the influence of cocktails of drug residues are unclear. The European Union has composed a list of compounds to be measured in surface water. These compounds are measured at set locations in the Netherlands. Additionally, the presence of other compounds, such as pesticides, are measured as well. These measurements are expected to become superfluous, since the EU recently made it compulsory for horticultural operations to purify their water emissions.

Insights regarding DeTaXion

There are multiple issues that pose difficulties for DeTaXion. For one, surface water contains a high variety of compounds, disturbing a lot of detection parameters. Therefore filtering is needed, before measurements can be done. Likely, this is also the case for other biosensors. Furthermore, K12 *E. coli* is a laboratory strain. Keeping these sensitive strains alive outside of the laboratory will be difficult.

The applicability of the biosensor is dependent on the duration of each measurement, the cost-efficiency and the ease of practical use. DeTaXion is a possible replacement for animal tests, giving it an advantage over some of the current bioassays.

It is essential that the *E. coli* presence remains low. Therefore, multiple tests on the presence of *E. coli* have been developed, such as tests using qPCR and eDNA. The problem with these new techniques, is the outdated legislation, although measurements are accurate, complicating the use of these techniques.